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Philosophy of Science and Ethics

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Philosophy of Science and Ethics

Interviewing HUGH LACEY

by Darlei Dall'Agnol

ethic@ - Would you, please, introduce yourself to the readers of ethic@ and tell us why you chose to study philosophy and what your main interests in it are?

Lacey: I have recently retired from the position of Professor of Philosophy at the Swarthmore College (Pennsylvania, U.S.A.) where I taught for thirty years. Prior to that I had spent three years in Brazil at Universidade de São Paulo, principally teaching Philosophy of Science. During those three years my wife, Maria Ines Rocha e Silva Lacey, was engaging in her doctoral studies at USP. My early academic formation was in mathematics at University of Melbourne (Australia), and from mathematics I moved to the study of history and philosophy of science. Both my M.A. and Ph.D are in history and philosophy of science, the former at University of Melbourne and the latter at Indiana University (U.S.A.). Most of my work has been in the philosophy of science, including philosophy of mathematics, philosophy of psychology and philosophy of the social sciences. In recent years, I have been especially interested in questions regarding the interaction of science and values. I have written extensively on these questions, offering a general philosophical analysis of how science and values may legitimately interact and applying this analysis to illuminate current controversies like the one concerning the use of transgenics in agriculture.

ethic@ - You are reading a paper here in Florianópolis on "The Interplay of the Cognitive and the Social in Scientific Practices". *Could you, please, synthesize the main ideas of your work?*

Lacey: There is a view about science that has been around for a long time: that science is value-free. One of the components of that view is that the central moments of scientific

practices have nothing to do with social and moral values. At the same time, of course, since science produces knowledge, it is necessary to evaluate theories, and theories are evaluated according to what some people have come to call cognitive values. By cognitive (or epistemic) values, I have in mind such things as empirical adequacy, explanatory power, predictive power, relationship with other properly accepted theories, and the like. While I think that there is a clear distinction between cognitive values and social values, I have maintained that in scientific practices there are deep interconnections between them. And what I have tried to do in this paper, continuing work done in other papers, is to explain exactly at what moments of scientific activity social values have a legitimate place, in contrast to the moments at which they don't. Very briefly, I think that they have a legitimate place at the moment of adopting a strategy in research. ["Strategy" is a term that I introduce in my book, *Is Science Value Free?* (London: Routledge, 1999).] When you adopt a strategy, you make decisions about the kind of investigation you are going to engage in, the kind of explanation you are going to look for, the kind of categories you will permit in your theories, and the kinds of empirical data you are going to seek out and record. I think that social values are often the key factor in deciding what strategy to adopt, but that, at the moment of accepting theories, there is no proper indispensable place for social values at all — whether or not a theory is soundly accepted depends only on the empirical data and the cognitive values. At a third moment, that of application of scientific knowledge, obviously social values are relevant.

ethic@ - It seems that you don't accept the dichotomy between facts and values. Is science neutral or value-laden?

Lacey: In *Is Science Value Free?* I make a distinction between the theses of *impartiality* and *neutrality* of science. On the one hand, sound appraisals of scientific theories should be made in accordance with *impartiality*, that is, they should be made solely in the light of empirical data and the cognitive values. On the other hand, the body of soundly accepted theories accords with *neutrality* only to the extent that the knowledge embodied in these theories can be used, in application, by people and groups regardless of their social or moral values. I have argued that there is a distinction between fact and value. At the same time, I think that establishing a scientific fact, or accepting theories that embody scientific

facts, is not sufficient to support *neutrality*; theories, which are soundly accepted in accordance with *impartiality*, may on application — nevertheless — especially favor some social and moral values rather than others. So, in response to the question "Is science value-free?" I maintain that it *ought* to be *impartial*, but this doesn't mean that it ought to be, or even can be, *neutral*. I have also argued that, currently, application of available scientific knowledge especially favors value outlooks that include a set of specifically modern values connected with the control of natural objects, and that the principal trajectories of modern scientific practices offer no promise of movement towards a greater manifestation of *neutrality*.

ethic@ - Which are, then, the main cognitive and moral values that inform science?

Lacey: I would like to divide that question up into the values that *do* inform science, and those that *ought* to inform science. I think that the most fundamental cognitive values, the ones that I briefly mentioned in an earlier response, are empirical adequacy, explanatory power, perhaps predicative power, and consistency with other soundly accepted theories. Some people would add simplicity to the list, but I am reluctant to do that. These values do inform a great deal of the scientific practice and, where they don't, we properly and reasonably talk about distortions of scientific knowledge. On the other hand, regarding moral and social values, I think there is a body of values connected with the control of natural objects (mentioned in my response to your previous question), which has significantly influenced what strategies are adopted in modern science. I do not maintain that adopting strategies ought never be influenced by these values. I do argue, however, that it ought not always or exclusively be so influenced for, when adopting strategies is informed exclusively by these values, there is a radical breakdown of *neutrality*. In the contemporary world this has particularly striking consequences, for the values connected with the control of natural objects tend to be embodied in institutions that also embody the values of capital, property and the market. Even so, I don't doubt that science, which is developed under strategies that bear close relationships with these values, produces knowledge. But, under these strategies, we cannot gain knowledge about such things as sustainable ecologies and the social impact of scientific applications. I think that scientific investigation, conducted under alternative strategies that are linked with values that contest

the values about control, should also be engaged in. I have often used the example of research in agroecology that is linked with values widely endorsed among popular organizations in places like Brazil. Today, as a matter of fact, research conducted under such alternative strategies is downplayed in the scientific mainstream. That is why I stress that *as a matter of fact* science is heavily informed by the (moral and social) values concerning the control of natural objects, and why I urge — as a revision within scientific practices — that space *ought to be* opened up for the conduct of research under a plurality of strategies, including strategies that are linked with values that contest those of control and the market. I contend further that such pluralism is necessary for it to be possible that *neutrality* become more fully manifested in scientific practices.

ethic@ - There is a huge discussion in Brazil today about genetically modified crops: whether we should forbid or allow them. In your book Valores e Atividade Científica (São Paulo: Discurso Editorial, 1998) *you seem to argue against the neoliberal idea that crops are private property and for the idea that they are a good for humanity. Don't you think that biotechnology can increase the production of food and, consequently, minimize poverty?*

Lacey: There are a number of aspects to this question. First of all, I think that what transgenic crops (like any other crops) are can be considered from a number of points of view. On the one hand, any crop consists of biological entities that can be studied biologically, for example, in terms of molecular biology or in terms of the structures of their genomes. On the other hand, a crop can also be studied as an ecological entity, as a component of ecological systems — and also as a socio-ecological (agroecological) entity. The science that informs the use of transgenics is essentially the science of molecular biology, since it produces the knowledge of how to transform the genetic structures of the genes of the plants for the sake of producing some desired effects. However, the same research that produces knowledge about how to produce transgenics tells us nothing about the side-effects of their use, where by "side-effects" I mean (for example) the effects on health and effects on the environment. Moreover, that research also doesn't address whether or not there might be better ways to produce crops than the transgenics ways. Why then the emphasis on transgenics? I believe that it is principally (though not exclusively) connected with the interests of the neoliberal system. But you question: don't I think that transgenics are good for humanity, that they can increase food supply, and so on. Obviously

I can only state a conclusion here. I give the arguments and the evidence in several articles.* I don't believe that biotechnology is likely to increase the amount of the production of food, and it may even decrease it. Today, under the socio-economic system in which food is produced, there is enough food produced to feed everyone. People are not hungry because there is not enough food produced to feed all of them, but because many people do not have access to food because they are poor. So, is biotechnology going to help to minimize poverty? Given that it is being developed under the very same system that maintains poverty today, I see no reason at all to expect it to contribute to minimize poverty. On the other hand, I think there are alternative forms of farming, many of which go under the name of agroecology, that are particularly well-suited for the use of farmers in poor countries. And I think that these promise at least to alleviate poverty to a significant extent. Incidentally, your colleagues in agronomy here in Florianópolis, Miguel Guerra and Rubens Nodari, are deeply involved in research on alternative approaches to farming.

ethic@ - Which are the main principles of agroecology?

Lacey: Agroecology can be contrasted with conventional forms of the agricultural practice, which tend to focus almost exclusively on the issue of productivity or producing the largest crop possible, and on the related issue of profit. Agroecology, in contrast, is usually thought of as operating in the light of four interacting principles or objectives. The first of these principles is productivity; of course agroecology wants to produce a crop that can feed people. The second is environmental or ecological stability, the preservation of fertility and the capacity of the land to produce for coming generations. The third is concerned with the preservation of biodiversity. Biodiversity is particularly crucial for the development of new crops and for farming systems being able to resist pests. And the fourth can be put in various ways. I prefer to put it in terms of its concern for the well-being of the local

* See my articles: "Seeds and their socio-cultural nexus," in S. Harding & R. Figueroa (eds.), *Science and other cultures: issues in the philosophy of science and technology*, pp. 91–105. New York: Routledge, 2003; "Tecnociência e os valores do Forum Social Mundial", in I.M. Loureiro, M.E. Cevasco & J. Corrêa Leite (eds), *O Espírito de Porto Alegre*, pp. 123–147. Editora Paz e Terra; "Assessing the value of transgenic crops," *Ethics in Science and Technology* 8: 497–511; "As sementes e o conhecimento que elas incorporam," *São Paulo em Perspectiva* 14 , No. 3 (2000): 53-59; "OGMs: a estrutura da controvérsia," *Com Ciência*: *Revista Electrônica de Jornalismo Científico*, No 32, May 2002, http://www.comciencia.br/reportagens/transgenicos/frames/trans12.htm

community. Thus, farming practices must ensure that the local community is well fed and nourished; this, of course, doesn't preclude that it also produce goods for the market. In the first place, the production of the food must serve those who are engaged in the production, their families, their communities, and so on. They are the primary beneficiaries of the production. The emphasis on environmental sustainability and on preservation of biodiversity means that, in contrast with conventional farming, the use of chemicals, as fertilizers and pesticides or whatever, is kept to an absolute minimum; and ideally, such chemicals are not used at all. Consequently, you may want to think of agroecology as a variety of organic agriculture. There are several varieties of agroecology, some of which are derived from or have close affinities with the traditional practices of local cultures. This is important for the fourth principle, since well-being of the local community includes strengthening of its culture, values and sense of history. Consistent with there being variety, these four principles capture the core components of agroecology.

ethic@ - What do you think about the Precautionary Principle?

Lacey: The Precautionary Principle has been adopted in several international and national legal documents over the past couple of decades. It is motivated by the concern that there have been technical and scientific advances which, when implemented, lead to unforeseen and very serious damage to human health and the environment. The basic idea of the Precautionary Principle — I can't give a precise formulation here — is that technical and scientific results should not be put into practical implementation, unless there is convincing evidence that the risks, which they may occasion to health and environment, are not severe. When adopted in formal agreements, it legitimates that governments may sometimes prohibit the practical implementation of technical and scientific advances because of the fear of risks, even though there is no direct scientific evidence for the seriousness of those risks at the present time — for it puts the burden of proof that there are no serious risks on the developer of a novel technology. Now, the Precautionary Principle has been invoked by many of the opponents of transgenics, and I guess I am broadly sympathetic to invoking it. What it would mean, in the case of transgenics, is not that all research on them must stop, but that they would not be released for practical use in agriculture until much more

severe tests concerning risks are carried out. I think that honest use of the principle requires describing explicitly what would be involved in these more severe tests. At the same time, I want to emphasize — this is not always emphasized by the proponents of the Precautionary Principle — one needs to bear in mind that any technological advance carries some risk; and so, the seriousness of risk should always be assessed in comparison with the risks and benefits that may be occasioned by alternative approaches. I would urge, in the case of the transgenics, that when using the Precautionary Principle, one also puts great emphasis upon the importance of doing research that investigates the productive potential of approaches like agroecology.

ethic@ - You have suggested new forms of scientific research not necessarily connected with nature's control. What do you think of this idea nowadays?

Lacey: I mentioned earlier that I think that any research presupposes that decisions have been made about what strategy to adopt. Adopting a strategy implies specifying what are the features of the theories we are going to try to test. When modern science develops closely in connection with values about control of natural objects, research tends to be conducted under strategies that aim to test theories that offer representations of the underlying order of things, the underlying structures, components, interactions of things, and the laws that govern them, in abstraction from the place of the things in ecological and social systems. I have already indicated, concerning agriculture, that research in biotechnology is of this kind; it is conducted in a way that abstracts crops (and seeds) from their ecological and social location. I have argued that alternative forms of research that are connected with values, like environmental sustainability and social well-being, would lead us to adopt different kinds of strategies, like those of agroecology which (in view of the four principles sketched above) do not abstract seeds and crops from their agro-ecological environment; under agroecological research strategies the impact of crops upon the ecology and society is a central focus of research. Note that "agroecology" refers to a form of farming in which ecological sustainability and social well-being, as well as productivity, are of central concern. It also refers to a form of scientific investigation that supports these agroecological-farming practices. Research conducted under agroecological strategies enables us to produce and accept theories that accord with *impartiality*. As I have already

indicated, I think that, unless alternative strategies like these become well developed within scientific institutions, the likelihood that the results of scientific practices will more fully accord with *neutrality* is close to zero.

ethic@ - Science, in its Baconian ideal (to control nature), seems to increase also the distance between developed and underdeveloped countries. How to reverse that? Is it enough to pay royalties to native peoples for their traditional knowledge of medical plants, etc.?

Lacey: At least in recent times, science connected with values concerning the control of natural objects has been closely connected with the developments of the capital and the market. I would suggest that without that connection a good deal of our modern science would never have developed. It is a two-way relationship. The values of the market and capital lead to investments in this kind of science, and this contributes to furthering the Baconian ideal; and the knowledge gained under its strategies comes to inform novel technological developments, which — in turn — contribute to deepening the embodiment of these values in contemporary society, thus furthering the neoliberal project. Given this socioeconomic context, it is inevitable that science developed in connection with the Baconian ideal will further that process of separation between the developed and underdeveloped countries. So, I agree with you. How could this process be reversed? I don't think that paying royalties to native peoples for pharmaceutical knowledge and the like is going to reverse it in any way. In fact, much more likely, what that would do is just to entrench the power of the market and that would lead to cultural disruption of these peoples. How, then, do reverse it? I think that the only way is to put emphasis on forms of development that will need input from research that adopts different strategies to those linked with the Baconian ideal, particularly those that are sensitive simultaneously to ecological stability and to human well-being.

ethic@ - Not only we pay for crops, but also the United States and the European Union have a very protective policy towards our agricultural products, overtaxing them. Is that not doubly unfair?

Lacey: Yes, it is unfair. I am not sure, however, that the way to remedy the unfairness is to simply abolish the protection. Certainly the United States and Europe are just hopelessly

hypocritical. On the one hand, they are arguing for the free market, but they are not practicing it, except when it is convenient for them to do so. The very structure of their economies makes it impossible for most poor countries to enter into the "free market" with any semblance of equality. On the other hand, I am not sure that it is the best thing for the underdeveloped countries to enter into the worldwide market system. Particularly when I think of the issue of food, it seems to me that these countries are more likely to gain greater food security for themselves by developing farming practices that strengthen their internal markets, rather than by making the consideration of exports the primary agricultural concern.

ethic@ - We have been discussing the ethical implications of science and technology. What do you think are the main contributions of science to ethics?

Lacey: I am going to stick with the agricultural case because I can be much more concrete when I deal with it. Think of transgenics again. We know that they work, that is to say that some crops can be grown that will be resistant to pesticides and the like. On the other hand, we know relatively little about the risks that they occasion and what their broader impact on society will be. It is presumably legitimate to go ahead with programs of development of transgenics if there is reason to believe that they do not occasion unacceptable risks for the environment and for society. Legitimation is an ethical matter. Is it legitimate to grow transgenic crops on a large scale? I don't think we can answer that question of legitimacy with any confidence, unless we gain scientific knowledge about the impact of these crops on the environment, and about the productive potential of alternative forms of farming such as agroecology — and we can only gain that knowledge if we conduct research under appropriate strategies. So, this is an ethical question (and there are many more ethical questions like it) of great urgency today that, I believe, cannot be answered with any kind of seriousness; unless we gain more scientific knowledge of a kind that mainstream science (linked with values concerning the control of natural objects) tends not to give us. I don't think gaining scientific knowledge will ever by itself settle such ethical questions definitively, but it becomes an absolutely important component to the ethical deliberation. Note that, rather than answer the question you put, I have responded the question: What kinds of scientific knowledge can contribute to ethical deliberation?

ethic@ - We are today in a kind of "moral disorder" caused by the advances of science and technology. What kind of contribution can philosophy make to reverse this scenario, that is, to see more clearly the place of science in our life?

Lacey: I think it is a somewhat of a simplification to say that the "moral disorder" we encounter today is caused by the advances of science and technology, unless one adds a bit more context. One might say that it is caused by advances of science and technology, which have been made within the framework of contemporary socio-economic relations. But I don't want to single out advances of science and technology as the principal cause here. Rather I think they are subordinate to the principal factor, namely economical institutions (especially neoliberal ones), and, of course, the governments that serve those institutions. So what can philosophy do? I'll just talk about philosophy of the science. First, I think it is important that philosophy of science contribute to making it clear that modern science has a social context, and that the predominant approach it has taken in modern times has been influenced by its links with modern capitalism, mediated by connections with modern values concerning the control of natural objects. Secondly, and this is a matter that I have discussed a lot in my recent work in philosophy of science, it is important to make the argument strongly that mainstream modern science has been conducted almost exclusively under just one strategy, one that is related to what you called the Baconian ideal, to emphasize that there is knowledge to be gained under other strategies, which have relationships with other values, such as social well-being and environmental sustainability. To me, a major task of philosophy of science, in trying to reverse the scenario of "moral disorder", is to make clear these aspects of the practice of modern science. I am also aware, of course, that philosophy lacks power; philosophy offers arguments, but the scenario will not be reversed just by making arguments. Even so, philosophy has to make its arguments in the public space, so that it can influence, and perhaps motivate, the lives of the people who are engaged in social practices.

ethic@ - Thank you very much for this interesting interview. Is there anything else you would like to add?

Lacey: I thought your questions were good. I enjoyed answering them. But, at the top of my head, I can't think of anything else at the moment. Thank you.